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# PATENT SPECIFICATION (11)

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## (54) IMPROVEMENTS IN OR RELATING TO BACK RESTS FOR CHAIRS OR THE LIKE

(71) We, KARL ZUND & Co. AG., a Swiss Body Corporate, of CH-9445, Rebesten, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a back rest for a chair, couch or the like, such a back rest, or back supporting portion, usually has a surface which is appropriately upholstered or covered.

According to one aspect of the present invention there is provided a back rest for a chair or the like and including a support frame supporting a resilient rail having its ends bent over at a sharp angle towards the support frame and held in abutments of which at least one is constructed displaceable and lockable and the area of the resilient rail lying between said ends is, when unstressed, bent concavely rearwards in the direction of the support frame and including adjusting means arranged to move the displaceable abutment or abutments and thus cause bending of the resilient rail from its unstressed shape to vary the shape of the surface to be used of the back rest.

Hereby it is, for example, possible to enable individual adjustment of the back rest to suit the back of persons using the chair, couch or the like. Depending on the degree of adjustment of the resilient rail, the rail bends either to the outside, or to the inside of the back rest so that in certain positions thereof a bulge or at least a diminishing of the indentation occurs in the back rest.

The resilient rail may carry several straps, bars or the like arranged spaced from one another and extending transversely to the longitudinal direction of the rail. The straps, bars or the like may extend approximately over the whole height of the support frame, at least one end of each strap, bar or the like being connected to a corresponding portion of the support frame.

Preferably the resilient rail and the straps, bars or the like are movably connected to

one another by means of rivets or the like. More preferably the straps are provided with longitudinal apertures for receiving the rivets or the like.

There may be a plurality of the resilient rails supported by the support frame.

This invention also provides in another aspect a chair or the like incorporating a back rest in accordance with the above-mentioned aspect of the present invention.

A specific embodiment of a back rest will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a front-elevation of a back rest according to the invention;

Figure 2 is a side elevation of the back rest of Figure 1;

Figure 3 is a plan view of the back rest shown in Figure 1;

Figure 4 illustrates the back rest upholstered as a back cushion;

Figure 5 is a side elevation of a chair incorporating the upholstered back rest of Figure 4, and

Figure 6 illustrates an alternative embodiment of a back rest of the invention.

The back rest shown in Figures 1 to 3 mainly comprises a rigid rail 1, a resilient rail 2, several transverse straps 3 and a frame 4. It is upholstered as a back cushion in Figures 4 and 5.

The rigid rail 1 is rigidly attached to the frame 4 which ensures that the rigid rail 1 is prevented from suddenly moving upwards or downwards in the back cushion. The resilient rail 2 is secured at its ends by means of fixed attachment, or abutment, 5 and displaceable attachment, or abutment, 6. Attachment 5 is formed by a bent up tongue of the rigid rail 1: it is also possible to design this attachment separately and subsequently to secure it to the rigid rail 1. The displaceable attachment 6 is held in position by means of a threaded spindle 7, the spindle bearing 8 being rigidly attached to the rigid rail 1. Because of the design in accordance with the invention there need not necessarily be any special securing of the resilient rail 2 since it is selfmounting

through its own spring force acting on the attachments 5 and 6.

The embodiment in accordance with Figure 1 to 3 is particularly advantageous because the ends 9 of the resilient rail are bent at sharp angles to the remainder of the rail, the free ends of which engage with the attachments 5 and 6. Because the area of the resilient rail 2 lying between the ends 9 is biased towards the rigid rail 1 an advantageous spring deflection is obtained. In its normal position there is no strain on the cushion because the resilient rail is deflected backwards. If the attachment 6 is moved by means of the spindle 7 and hand wheel 10, the resilient rail 2 first moves so as to form a straight surface and only if the attachment 6 is moved further will the flexible rail 2 bend outwards. In this way it is possible to adjust the back rest to obtain a curve practically over its entire width and not only in its middle. Therefore, a large area is obtained in which the cushion is curved outwards, practically parallel to its entire area.

It proved to be practical to manufacture the resilient rail 2 and also the transverse straps 3 from spring steel. It is however also possible to use plastic rails and straps or also, instead of using transverse straps, transverse rods may be used.

In the embodiment in accordance with Figures 1 to 3 the straps 3 extend virtually over the entire height of the frame 4, one end of each of the straps 3 being attached to the appropriate section 11 of the frame 4.

Due to this arrangement the entire area of a back cushion or back rest to be utilized is practically varied when the position of the resilient rail 2 is adjusted. Therefore a curve is evenly provided from the top to the bottom whereby the curve is greatest in the lower third of the cushion. To increase this effect it is envisaged that the straps 3 be of a curved design with the inner curve facing the resilient rail.

The resilient rail 2 and the strap 3 are attached to each other by means of rivets 12, the transverse straps 3 preferably being provided with elongated holes. In this way the movements resulting from the displacement of the resilient rail 2 and straps 3 between the resilient rail 2 and the transverse straps 3 are equalised.

Figures 2 and 3, clearly show the position of the rail 2, and the straps 3 in a non stressed condition and also in a curved final position. The curved final position is shown in broken lines.

From Figure 4 it can be seen that the frame 4 provides practical stabilization for the rigid rail 1 and the resilient rail 2. Additionally the frame 4 can be utilized for stabilization of a back cushion. From the outside only the hand wheel 10 for adjustment of the resilient rail 2 can be seen but

since it can have the same basic colour as that of the back cushion, it is hardly noticeable.

Figure 5 shows a side elevation of a chair in which different curves are shown. These curves have been exaggerated to illustrate how the back cushion can be adjusted to suit practically every body shape.

Utilization of this device is not limited to back cushions because with an appropriately stronger frame it can be used directly as a back rest; for instance appropriately strong material can be used as a cover. In such a case a back rest can be adjusted to suit any body shape. If required, several transverse straps 3 could be mounted next to each other so that these virtually form one single surface.

Figure 6 illustrates a further embodiment of the back rest according to this invention. It can be seen that the provision of a loop frame as in Figures 1 to 4 is not necessarily important, as the rigid rail 1 and therefore the resilient rail 2 can be mounted by means of some other appropriate support frame. It is possible to utilize a U-shaped frame 13, so that stabilization is affected towards the bottom. This ensures that the rigid rail 1 cannot move towards the bottom. In an arrangement like this, the straps 3 require guidance over a small area only and therefore they may be correspondingly short in length.

With the described back rest selective variation of the shape of at least the surface of a back cushion or back rest to be utilized can be effected by means of the adjustable curving of rail 2. The invention certainly makes it possible to arrange a number of these rail assemblies on top of or next to each other so that appropriate adjustment of the shape of a back cushion or a back rest can also be effected over a larger area.

#### WHAT WE CLAIM IS:—

1. A back rest for a chair or the like and including a support frame supporting a resilient rail having its ends bent over at a sharp angle towards the support frame and held in abutments of which at least one is constructed displaceable and lockable and the area of the resilient rail lying between said end is, when unstressed, bent concavely rearwards in the direction of the support frame and including adjusting means arranged to move the displaceable abutment or abutments and thus cause bending of the resilient rail from its unstressed shape to vary the shape of the surface to be used of the back rest.

2. A back rest as claimed in claim 1, wherein the resilient rail carries several straps, bars or the like arranged spaced from one another and extending transversely to the longitudinal direction of the rail.

3. A back rest as claimed in claim 2, wherein the straps, bars or the like extend approximately over the whole height of the support frame, at least one end of each strap, bar or the like being connected to a corresponding portion of the support frame.
4. A back rest as claimed in claim 3, wherein the resilient rail and the straps, bars or the like are movably connected to one another by means of rivets or the like.
5. A back rest as claimed in claim 4, wherein the straps are provided with longitudinal apertures for receiving the rivets or the like.
6. A back rest as claimed in any one of claims 2 to 5, wherein the straps, rods or the like are curved.
7. A back rest as claimed in any one of the preceding claims, wherein for moving a displaceable abutment the adjusting means comprises a threaded spindle, the spindle bearing being fixed with respect to the support frame.
8. A back rest as claimed in any one of the preceding claims, wherein the support frame is of U-shape and the resilient rail extends between the arms of the U-shaped frame.
9. A back rest as claimed in any one of the preceding claims, wherein the support frame supports a plurality of the resilient rails.
10. A back rest for a chair or the like, substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 5, or Figure 6 of the accompanying drawings.
11. A chair or the like incorporating a back rest as claimed in any one of the preceding claims.

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Fig. 1

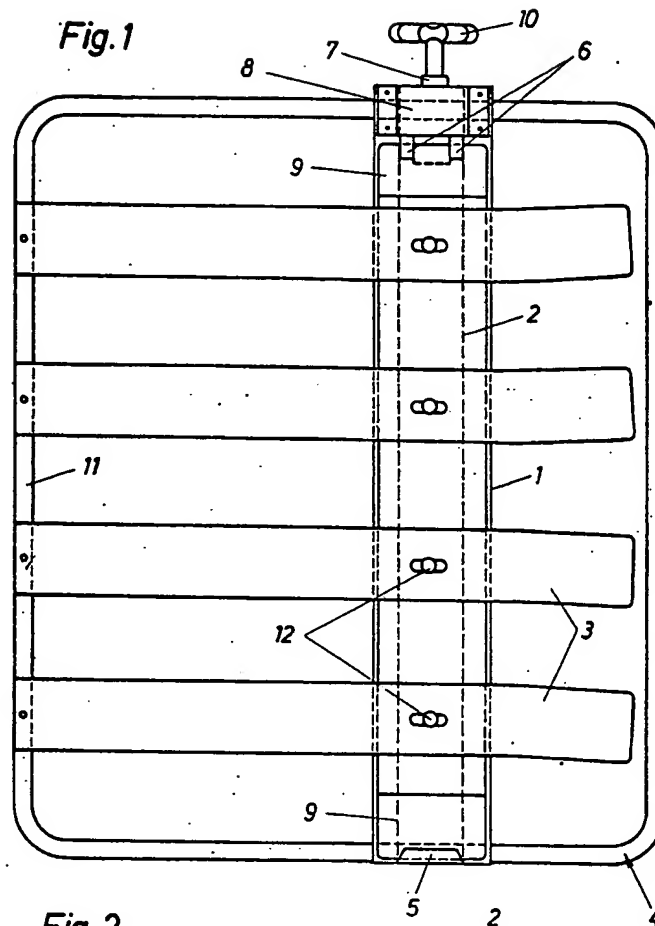


Fig. 2

